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IMAGE FORMATION APPARATUS (German)

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### ABSTRACT

**PURPOSE:** To absorb impact of a transfer material which enters a fixing portion to prevent the impact from being transmitted to a transfer portion by providing a transport belt moved along the upper surface of a suction deck formed to be turned down at the corners and a suction means for sucking a transfer material to the transport belt through suction holes of the suction deck.

**CONSTITUTION:** A transfer material S which has passed through a transfer portion X is sucked towards a transport belt 33 by a suction device 40, and transported to a fixing portion Y by the friction with the transport belt 33. At this time, as a suction deck 20 for supporting the transport belt 33 is formed to be turned down at the corners, the transfer material S is bent like a mountain in the vicinity of the top portion 22 of the suction deck by its firmness to form a gap with the transport belt 33 and produce a slack in such a manner as to surround the gap. Accordingly, when the leading end of the transfer material S enters the fixing portion Y and the impact at that time is transmitted towards the trailing end side of the transfer material S, the impact is absorbed as deformation of the slack portion not to be transmitted to the transfer portion.

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⑮ 発明の名称 画像形成装置

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## 明 細 書

## 1. 発明の名称

画像形成装置

## 2. 特許請求の範囲

(1) 転写部でトナー像が転写された転写材を定着部に搬送し、ここで前記トナー像を転写材に定着する画像形成装置において、

前記転写部から定着部に転写材を搬送する搬送装置を、へ字状に形成されたサクシオンデッキと、該サクシオンデッキの上面に沿って移動する搬送ベルトと、前記サクシオンデッキに設けた吸引孔を介して転写材を前記搬送ベルトに向かって吸引する吸引手段と、で構成したことを特徴とする画像形成装置。

## 3. 発明の詳細な説明

〔産業上の利用分野〕

本発明は、複写機、プリンタ、ファクシミリなどの画像形成装置に関するものである。

〔従来技術〕

粉体トナーを使用する画像形成装置では、転写

部で転写材に転写されたトナーは、定着部で加熱されて転写材に定着されるが、小型の画像形成装置では、転写部から定着部までの距離が短いことから、まだ転写中の転写材の先端が定着部に進入し、そのときの衝撃が転写部に位置する転写材に伝わり、転写トナー像が乱れて画質不良を生じることがある。

このため、転写部と定着部との間にいわゆるエアサクシオン方式のコンベア装置を2台設け、それらの搬送速度を遅えることで、両コンベア装置の間で転写材に弛みを形成し、この弛みに定着部進入時の衝撃を吸収するようにした画像形成装置が実開昭63-138554号公報で提案されている。

〔発明が解決しようとする課題〕

しかしながら、前記画像形成装置では、コンベア装置の転写材搬送速度を切り換えるための特別の機構や制御機器が必要となり、装置が複雑化、大型化するという問題点を有していた。

〔課題を解決するための手段〕

そこで、本発明は前記問題点を解決するためになされたもので、画像形成装置において、転写部から定着部に転写材を搬送する搬送装置を、への字状に形成されたサクシオンデッキと、該サクシオンデッキの上面に沿って移動する搬送ベルトと、前記サクシオンデッキに設けた吸引孔を介して転写材を前記搬送ベルトに吸引する吸引手段と、で構成したものである。

#### 〔作用〕

前記構成によれば、転写部を通過した転写材は、吸引装置で搬送ベルトに向かって吸引され、該搬送ベルトとの摩擦によって定着部に搬送される。このとき、搬送ベルトを支持するサクシオンデッキはへの字状に形成されているので、転写材はそれ自身の腰の強さによって、サクシオンデッキ頂上部近傍で山なりに折れ曲がり、搬送ベルトとの間に隙間を形成し、この隙間を囲むように弛みを生じる。

したがって、転写材の先端が定着部に進入し、そのときの衝撃が転写材の後端側に向かって伝達

されると、この衝撃は前記弛み部分の変形として吸収され転写部に伝わることはない。

#### 〔実施例〕

以下、本発明の実施例を説明する。

第1図に示す画像形成装置では、矢印a方向に回転する感光体1の外周面が帯電チャージ2で帯電され、その帯電領域にイメージ光3が露光されて静電潜像が形成される。この静電潜像は現像装置4でトナー像として顕像化され、転写チャージ5との対向部（以下、「転写部」という。）Xで前記トナー像が転写材に転写される。なお、転写材は給紙部6より一枚づつ供給され、タイミングローラ7でトナー像とタイミングをとって転写部Xに送り出される。

転写部Xを通過した転写材は、分離チャージ8で感光体1から分離され、搬送装置9で定着装置10に搬送されて前記トナー像が転写材に加熱定着されたのち排出ローラ11でトレイ12に排出される。

次に、本発明の要旨である搬送装置9について

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説明する。

搬送装置9は、概略、サクシオンデッキ20、コンベア装置30、吸引装置40で構成されている。

サクシオンデッキ20は、第3図に示すように、その上部ガイド面21が所定の角度 $\alpha$ をもってへの字状に形成され、その頂上部22が中央よりも定着部側にずらしてあり、転写部側の斜面23が定着部側の斜面24よりも長くしてある。また、前記斜面23、24の裾側にそれぞれ吸引孔25、26が設けてあり、転写部側吸引孔25の開口面積が転写部側吸引孔26の開口面積よりも大きくしてある。

コンベア装置30は、一対のローラ31、32と、複数の孔（図示せず）を有する搬送ベルト33とからなり、前記ローラ31、32はサクシオンデッキ20の転写部側、定着部側にそれぞれ配置され、これらローラ31、32とサクシオンデッキ20を囲むように搬送ベルト33と巻回され、ローラ間でサクシオンデッキ20の上部ガイド面

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21に沿って支持されている。

吸引装置40はサクシオンデッキ20の下に配置され、サクシオンデッキ20の吸引孔25、26を介して搬送ベルト33の孔を介してベルト上のエアを吸引するようにしてある。

以上の構成において、転写部Xを通過した転写材Sはタイミングローラ7の搬送力に基づいてサクシオンデッキ20の上に搬送され、吸引装置40によって吸引孔25、26より下方に吸引されているサクシオンエアに引かれて搬送ベルト33に吸着される。

搬送ベルト33に吸着された転写材Sは、ローラ31、32の回転に基づいてサクシオンデッキ20の回りを移動する搬送ベルト33の移動とともに矢印m方向に搬送され、サクシオンデッキ20の転写部側傾斜23に沿って上動し、頂上部22を通過し、定着部側傾斜24に沿って下っていく。また、斜面24に沿って下っていく途中で、吸引装置40によって吸引孔26より下方に吸引されているサクシオンエアに引かれて搬送ベルト33

に吸着される。ただし、定着部側の吸引孔26は転写部側の吸引孔25よりも開口面積が小さく、定着部側吸引孔26の吸引力 $F_1$ は転写部側吸引孔25の吸引力 $F_2$ よりも小さくなっている。

以上のようにして転写材Sはサクシオンデッキ20の上部ガイド面21に沿って搬送され、サクシオンデッキ頂上部22の近傍では山なりに湾曲した状態で移動する。つまり、頂上部22の近傍では、転写材Sが搬送ベルト33から浮き上がった状態で移動し、転写材自身に弛み $S_a$ が形成される。

定着装置10では、定着上ローラ51と定着下ローラ52がそれぞれ矢印b、c方向に回転しており、搬送装置9を通過した転写材Sの先端はローラ51、52の接触領域(定着部)Yに案内される。このとき、転写材Sの先端が上下いずれかのローラ外周面に当たり、その衝撃によって搬送装置9を搬送されている転写材Sが定着部側斜面24を移動するベルト33に対して相対的に後退し、その後退量が前記弛み $S_a$ の変形に吸収され

る。また、前記衝撃の一部は転写部側斜面23を移動する転写材Sにも伝達されるが、ここでは吸引装置40の転写材Sに対する吸引力 $F_1$ が大きいため、転写材Sが搬送ベルト33に対して相対的に後退することはない。

したがって、転写部Xで転写材Sに転写されるトナー像に乱れが生じることはなく、高画質の画像が得られる。

ところで、サクシオンデッキ頂上部22の折れ曲げ角度 $\alpha$ は、画像形成装置に用いられる転写材Sの腰の強さによって異なり、複写機、プリンタ、ファクシミリなどで一般に使用される普通紙の場合、約 $150^{\circ}$ ~ $170^{\circ}$ が適当で、 $160^{\circ}$ ~ $165^{\circ}$ の範囲が弛み $S_a$ を形成する上で最も好ましい。

なお、以上の説明では、転写部側の吸引孔25と定着部側の吸引孔26の大きさを変えることで、両側の転写材Sに対する吸引力 $F_1$ 、 $F_2$ を違えるものとしたが、吸引装置40を2つ設け、転写部側の吸引孔25に接続する吸引装置の風量を、定着部側の吸引孔26に接続する吸引装置の風量よ

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りも多くすることで吸引力に差を設けるようにしてもよい。

#### (発明の効果)

以上の説明で明らかなように、本発明に係る画像形成装置では、画像形成中に駆動を切り換えるような機構・制御を必要とせず、簡単な構成によって定着部に進入する転写材の衝撃を吸収し転写部に伝わるのを防止することができる。

#### 4. 図面の簡単な説明

第1図は画像形成装置の概略断面図、第2図は搬送装置の断面図、第3図はサクシオンデッキの斜視図である。

9…搬送装置、20…サクシオンデッキ、21…上部ガイド面、22…頂上部、25、26…吸引孔、30…コンベア装置、31、32…ローラ、33…搬送ベルト、40…吸引装置、X…転写部、Y…定着部、S…転写材、 $F_1$ 、 $F_2$ …吸引力。

特許出願人 ミノルタカメラ株式会社

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[54] IMAGE FORMING APPARATUS

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[21] Appl. No.: 595,248

[22] Filed: Oct. 10, 1990

[30] Foreign Application Priority Data

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Aug. 10, 1990 [JP] Japan ..... 2-212188

[51] Int. Cl.<sup>3</sup> ..... G03G 15/00

[52] U.S. Cl. .... 355/312; 355/309;  
355/321; 271/194; 271/283

[58] Field of Search ..... 355/312, 308, 309, 73,  
355/321; 271/3.1, 184, 194, 195, 283

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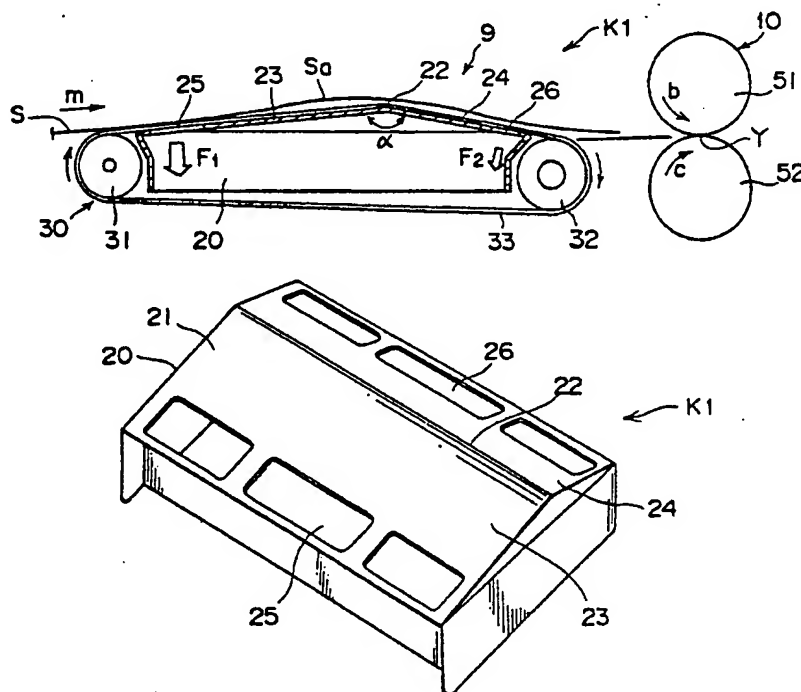
63-138554 9/1988 Japan  
64-44475 2/1989 Japan

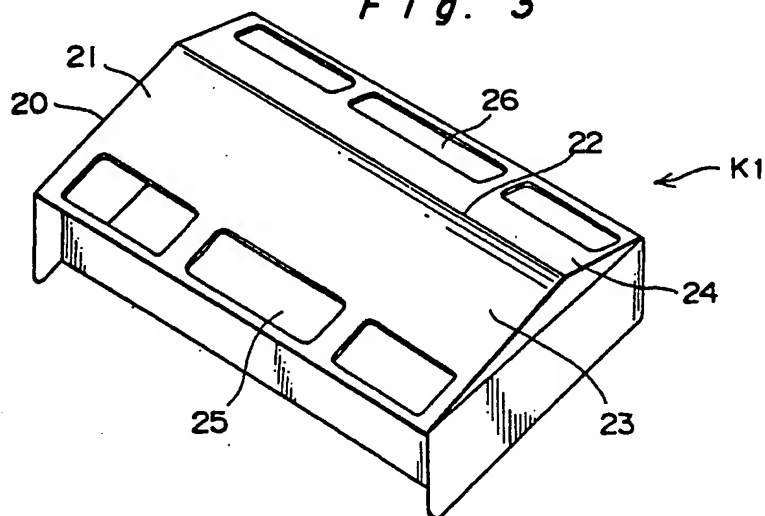
Primary Examiner—R. L. Moses  
Attorney, Agent, or Firm—William, Brinks, Olds, Hofer,  
Gilson & Lione

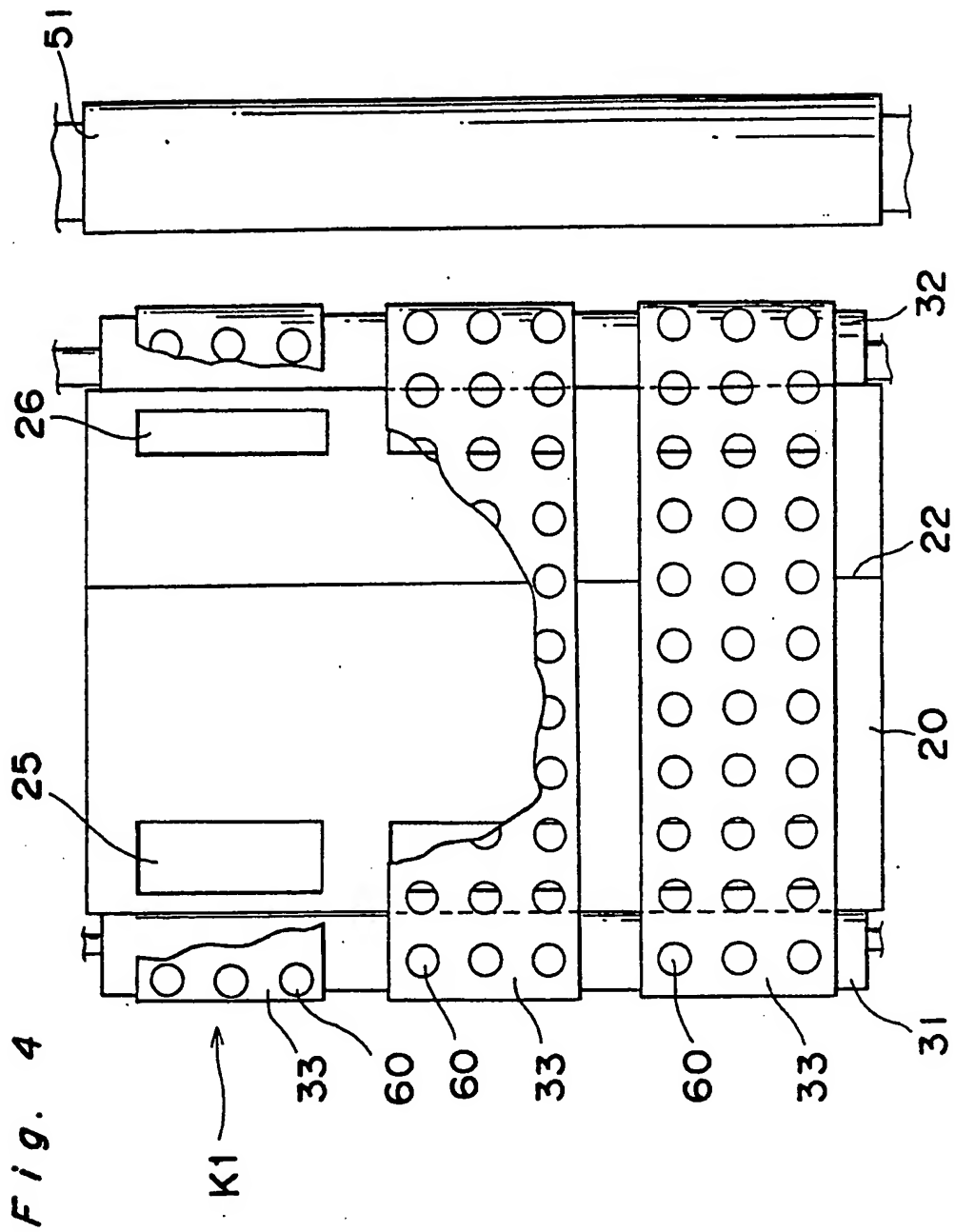
[57] ABSTRACT

An image forming apparatus comprising: an image forming device for forming a toner image on a photo-sensitive member; a transfer device for transferring the toner image to a recording paper sheet; a fixing device for fixing the toner image onto the recording paper sheet, which is so provided as to be spaced a predetermined distance from the transfer device; a guide member which has first and second inclined faces for guiding the recording paper sheet obliquely upwardly and downwardly to the fixing device, respectively; the first and second inclined faces being, respectively, formed with first and second suction openings; a transport belt device for transporting the recording paper sheet to the fixing device along the first and second inclined faces, which is wound along the first and second inclined faces and is formed with a plurality of holes; and a suction device which sucks air above the first inclined face through the holes of the transport belt device and the first suction opening and sucks air above the second inclined face through the holes of the transport belt device and the second suction opening so as to bring the recording paper sheet into close contact with the first and second inclined faces, respectively.

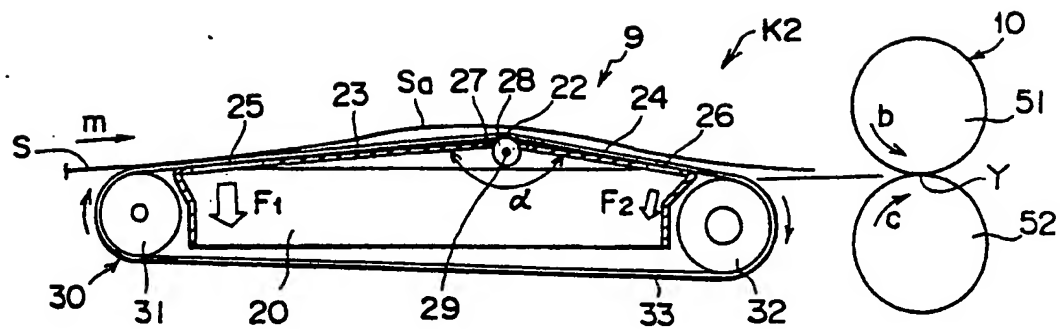
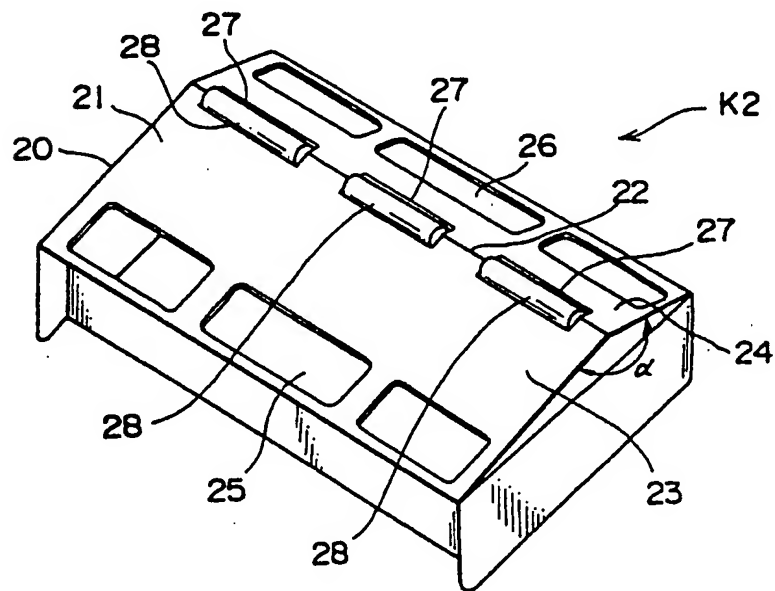
12 Claims, 4 Drawing Sheets

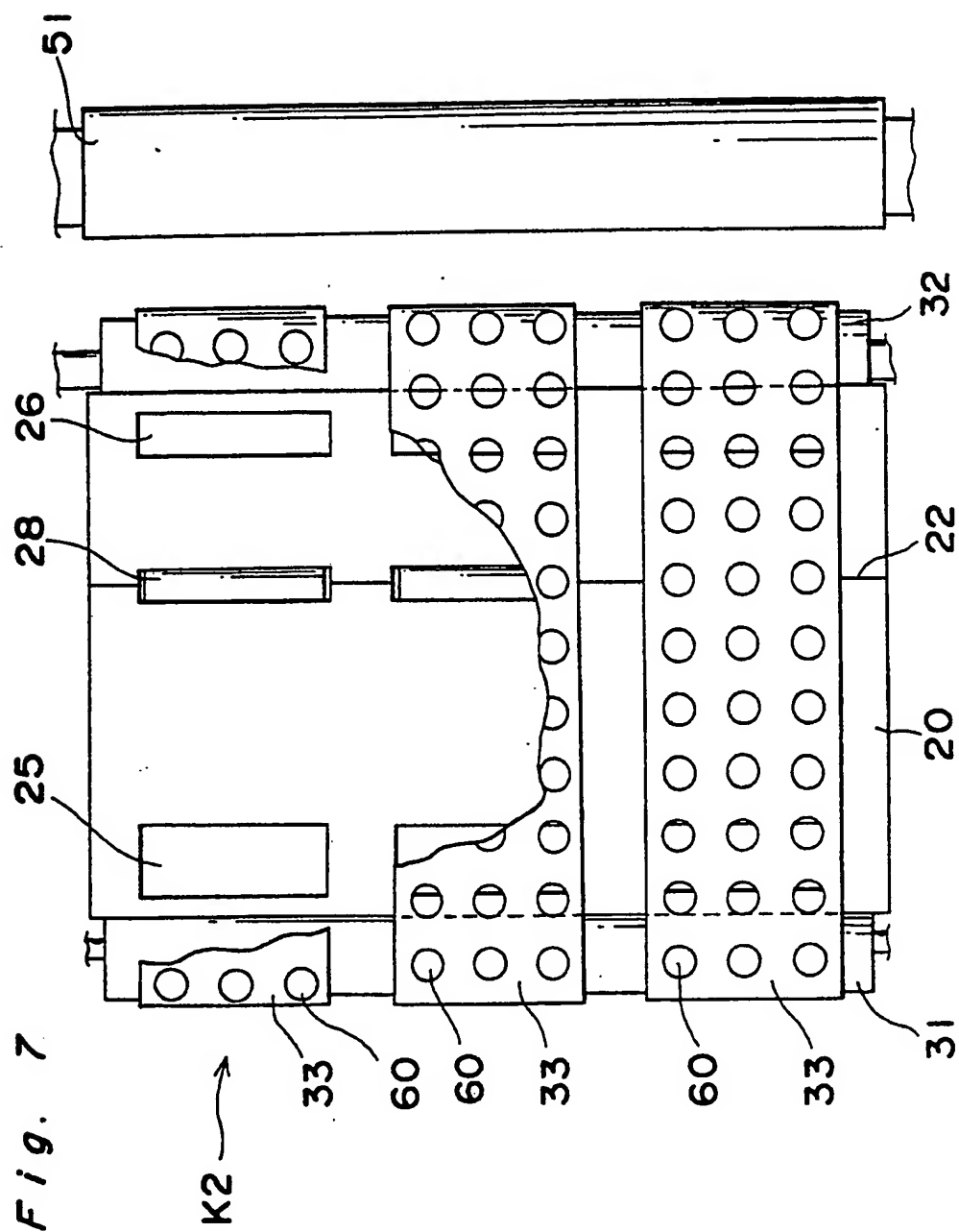








*Fig. 5**Fig. 6*



## IMAGE FORMING APPARATUS

### BACKGROUND OF THE INVENTION

The present invention relates to an image forming apparatus such as a copying apparatus, a printer, a facsimile machine, etc.

In known image forming apparatuses employing powdery toner, toner transferred to a transfer medium at a transfer section is fixed, through heating, onto the transfer medium at a fixing section. However, in a compact image forming apparatus, since a distance from the transfer section to the fixing section is short, a leading edge of the transfer medium proceeds into the fixing portion while toner is being transferred to the transfer medium, so that an impact force caused by feeding of the transfer medium into the fixing section is transmitted to the transfer medium disposed at the transfer section and thus, the transferred toner image is disordered, thereby resulting in aggravation of image quality.

Therefore, in order to eliminate the above described inconvenience, Japanese Utility Model Laid-Open Publication No. 63-138554 proposed an image forming apparatus in which two air suction type conveyor devices are provided between the transfer section and the fixing section and transport speed of one of the conveyor devices is made different from that of the other of the conveyor devices so as to form a slack of the transfer medium between the conveyor devices such that the impact force caused by delivery of the transfer medium into the fixing section is absorbed by the slack of the transfer medium.

However, this prior art image forming apparatus has such drawbacks that since a special mechanism and a control unit are required to be additionally provided for changing over the transport speeds of the conveyor apparatuses, the apparatus becomes complicated in construction and large in size.

### SUMMARY OF THE INVENTION

Accordingly, an essential object of the present invention is to provide an image forming apparatus with a view to eliminating the disadvantages inherent in conventional image forming apparatuses.

In order to accomplish this object of the present invention, an image forming apparatus according to the present invention includes a transport device for transporting a transfer paper sheet from a transfer section to a fixing section, the transport device comprising: a chevron-shaped suction deck which is formed with a suction opening; a transport belt which travels along an upper face of the suction deck; and a suction means for sucking the transfer paper sheet towards the transport belt through the suction opening of the suction deck.

By the above described arrangement of the image forming apparatus, the transfer paper sheet having passed through the transfer section is sucked towards the transport belt by the suction device so as to be conveyed to the fixing device through friction between the transfer paper sheet and the transport belt. At this time, since the suction deck supporting the transport belt is formed into a chevron-shaped configuration, the transfer paper sheet is curved arcuately by its own rigidity in the vicinity of the top portion of the suction deck so as to define a gap relative to the transport belt such that a slack surrounding the gap is formed on the transfer paper sheet.

Accordingly, when the leading edge of the transfer paper sheet proceeds into the fixing section and an impact force is transmitted to the trailing edge of the transfer paper sheet, the impact force is absorbed by the slack without being transmitted to the transfer section.

### BRIEF DESCRIPTION OF THE DRAWINGS

This object and features of the present invention will become apparent from the following description taken in conjunction with the preferred embodiments thereof with reference to the accompanying drawings, in which:

FIG. 1 is a schematic sectional view of an image forming apparatus according to a first embodiment of the present invention;

FIG. 2 is a sectional view of a transport device of the image forming apparatus of FIG. 1;

FIG. 3 is a perspective view of a suction deck of the transport device of FIG. 2;

FIG. 4 is a top plan view of the transport device of FIG. 2; and

FIGS. 5 to 7 views similar to FIGS. 2 to 4, respectively, particularly showing a second embodiment of the present invention.

Before the description of the present invention proceeds, it is to be noted that like parts are designated by like reference numerals throughout several views of the accompanying drawings.

### DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, there is shown in FIG. 1, an image forming apparatus K1 according to a first embodiment of the present invention. In the apparatus K1, an outer peripheral surface of a photosensitive member 1 rotating in the direction of the arrow a is electrically charged by a corona charger 2 and imaging light 3 is exposed at the electrically charged region of the photosensitive member 1 so as to form an electrostatic latent image. The electrostatic latent image is developed into a visible toner image by a developing device 4. Then, at a section X confronting a transfer charger 5 (hereinbelow, referred to as a "transfer section"), the toner image on the photosensitive member 1 is transferred to a transfer paper sheet. The transfer paper sheet is supplied one sheet by one sheet from a paper feeding portion 6 and is delivered to the transfer section X synchronously with the toner image on the photosensitive member 1 by a pair of timing rollers 7.

Subsequently, the transfer paper sheet having passed through the transfer section X is separated from the photosensitive member 1 by a charge eraser 8 and is conveyed by a transport device 9 to a fixing device 10 where the toner image is fixed onto the transfer paper sheet. Thereafter, the transfer paper sheet is ejected onto a tray 12 by a pair of outlet rollers 11.

Hereinbelow, the transport device 9 which constitutes a main feature of the present invention is described with reference to FIGS. 2 to 4. The transport device 9 is substantially constituted by a suction deck 20, a conveyor device 30 and a suction device 40 (FIG. 1).

As shown in FIG. 3, the suction deck 20 has an upper guide face 21 which is formed into a chevron-shaped configuration having a predetermined angle  $\alpha$ . Thus, the upper guide face 21 has an inclined face 23 at the side of the transfer section X and an inclined face 24 at the side of a fixing section Y. A top portion 22 of the upper guide face 21 deviates towards the fixing section

Y from the center of the upper guide face 21. Therefore, the inclined face 23 is longer than the inclined face 24. Meanwhile, three rectangular suction openings 25 are formed at the foot of the inclined face 23, while three rectangular suction openings 26 are formed at the foot of the inclined face 24. An area of each of the suction openings 25 is made larger than that of each of the suction openings 26.

The conveyor device 30 is constituted by a pair of rollers 31 and 32 and three transport belts 33 each formed with a plurality of holes 60. The rollers 31 and 32 are, respectively, disposed adjacent to the transfer section X and the fixing section Y. The transport belts 33 are wound around the rollers 31 and 32 and the suction deck 20 and are supported along the upper guide face 21 of the suction deck 20 between the rollers 31 and 32.

The suction device 40 is disposed below the suction deck 20 so as to suck air above the transport belts 33 through the holes 60 of the transport belts 33 and the suction openings 25 and 26 of the suction deck 20.

In the above described arrangement of the image forming apparatus K1 the transfer paper sheet S having passed through the transfer section X is conveyed onto the suction deck 20 by a transport force of the timing rollers 7 and is sucked to the transport belts 33 by suction air drawn downwardly through the holes 60 of the transport belts 33 and the suction openings 25 by the suction device 40. The transfer paper sheet S sucked to the transport belts 33 is carried in the direction of the arrow m by travel of the transport belts 33 running around the suction deck 20 through rotation of the rollers 31 and 32 and is displaced obliquely upwardly along the inclined face 23 adjacent to the transfer section X. Subsequently, the transfer paper sheet S passes through the top portion 22 and then, travels obliquely downwardly along the inclined face 24 adjacent to the fixing section Y. In the course of downward travel of the transfer paper sheet S along the inclined face 24, the transfer paper sheet S is sucked to the transport belts 33 by suction air drawn downwardly through the holes 60 and the suction openings 26 by the suction device 40. Since the area of each of the suction openings 26 is smaller than that of each of the suction openings 25 as described above, a suction force F2 of the suction openings 26 adjacent to the fixing section Y is smaller than a suction force F1 of the suction openings 25 adjacent to the transfer section X.

Accordingly, the transfer paper sheet S is transported along the upper guide face 21 of the suction deck 20 and is displaced in an arcuately curved state in the vicinity of the top portion 22 of the suction deck 20. Namely, in the vicinity of the top portion 22, the transfer paper sheet S is displaced while being separated away from the transport belts 33 so as to form a slack Sa.

At the fixing device 10, an upper fixing roller 51 and a lower fixing roller 52 are, respectively, rotated in the directions of the arrows b and c. A leading edge of the transfer paper sheet S having passed through the transport device 9 is guided to the fixing section Y where the upper and lower fixing rollers 51 and 52 are brought into contact with each other. At this time, the leading edge of the transfer paper sheet collides with an outer peripheral surface of either one of the upper and lower fixing rollers 51 and 52 and thus, is subjected to an impact force. Therefore, the transfer paper sheet S being conveyed through the transport device 9 is retreated relative to the transport belts 33 travelling along

the inclined face 24 adjacent to the fixing section Y such that amount of retreat of the transfer paper sheet S is absorbed by the slack Sa. Meanwhile, a portion of the impact force is transmitted also to the transfer paper sheet S being conveyed through the inclined face 23 adjacent to the transfer section X. However, since the suction force F1 at the suction openings 25 is made larger than the suction force F2 at the suction openings 26 as described above, the transfer paper sheet S is not retreated relative to the transport belts 33 travelling along the inclined face 23. Therefore, the toner image transferred to the transfer paper sheet S at the transfer section X is not disordered and thus, a high-quality image can be obtained.

Meanwhile, the bending angle  $\alpha$  of the top portion 22 of the suction deck 20 varies according to rigidity of the transfer paper sheet S employed in the image forming apparatus K1. In the case of plain paper sheets used usually in a copying apparatus, a printer, a facsimile machine, etc., it is proper that the angle  $\alpha$  assumes about 150 to 170°, most desirably 160 to 165° for forming the slack Sa.

Meanwhile, in the foregoing, the suction force F1 at the suction openings 25 adjacent to the transfer section X is made different from the suction force F2 at the suction openings 26 adjacent to the fixing section Y by making size of each of the suction openings 25 different from that of each of the suction openings 26. However, in order to make the suction forces F1 and F2 different from each other, it can also be so arranged that first and second suction devices are provided for the suction openings 25 and 26, respectively and air flow of the first suction device connected to the suction openings 25 is made larger than that of the second suction device connected to the suction openings 26.

As is clear from the foregoing description, in the image forming apparatus according to the first embodiment of the present invention, the impact force applied to the transfer paper sheet proceeding to the fixing section can be absorbed so as not to be transmitted to the transfer section by the simple arrangement without the need for additional provision of a mechanism and a control unit for changing over drive of the image forming apparatus during the image forming process.

FIGS. 5 to 7 show the transport device 9 of an image forming apparatus K2 according to the second embodiment of the present invention. It is to be noted that FIG. 1 applies also to the image forming apparatus K1. As shown in FIG. 6, three rectangular openings 27 are formed at the top portion 22 of the suction deck 20 so as to extend at right angles with the transport direction of the transfer paper sheet S. A roller 28 is provided in each of the openings 27 such that an outer peripheral portion of the roller 28 projects upwardly from each of the openings 27. The rollers 28 are rotatably mounted on a shaft 29 traversing the suction deck 20. The transport belts 33 are wound around the rollers 31 and 32, the suction deck 20 and the rollers 28 disposed at the top portion 22 of the suction deck 20. Since other constructions of the image forming apparatus K2 are similar to those of the image forming apparatus K1, description thereof is abbreviated for the sake of brevity.

In the above described arrangement of the image forming apparatus K2, the transport belts 33 are carried in the direction of the arrow through rotation of the rollers 31 and 32 so as to pass over the rollers 28. The rollers 28 are arranged to be rotated through travel of the transport belts 33. Since the rollers 28 project up-

wardly from the top portion 22 of the suction deck 20, a frictional resistance force applied from the suction deck 20 to the transport belts 33 is small. Therefore, a load applied to a drive system of the rollers 31 and 32 is small and thus, it becomes possible to secure stable travel of the transport belts 33.

Meanwhile, if the transport belts 33 are displaced in contact with the suction deck 20, such a problem may arise that since toner penetrating between the transport belts 33 and the suction deck 20 is fused by frictional heat between the transport belts 33 and the suction deck 20, the fused toner functions as adhesive so as to immovably bond the transport belts 33 to the suction deck 20. However, in this embodiment, since the transport belts 33 are, respectively, guided by the rollers 28 at the top portion 22 of the suction deck 20 so as to be held out of contact with the suction deck 20, the above described problem is obviated.

The transfer paper sheet S sucked to the transport belts 33 by suction air drawn downwardly through the holes 60 and the suction openings 25 by the suction device 40 is conveyed in the direction of the arrow m by travel of the transport belts 33 and is displaced obliquely upwardly along the inclined face 23 so as to pass over the rollers 28 at the top portion 22. Subsequently, the transfer paper sheet S is carried obliquely downwardly along the inclined face 24.

As described above, the transfer paper sheet S is transported along the upper guide surface 21 of the suction deck 20 and is displaced in a gently curved state in the vicinity of the top portion 22 of the suction deck 20. Namely, in the vicinity of the top portion 22, the transfer paper sheet S is displaced while being spaced away from the transport belts 33 so as to form the slack Sa.

TABLE 1

Basis wt. of transfer paper sheet (g/m <sup>2</sup> )	Angle $\alpha$ (°)					
	175	170	168	165	160	157
51.4	C	C	C	B	B	B
60	C	C	C	B	A	A
64	C	C	B	A	A	A
70	C	B	B	A	A	A
80	B	B	A	A	A	A
85	B	A	A	A	A	A
91.4	A	A	A	A	A	A
104.7	A	A	A	A	A	B
127	A	A	A	A	A	C
157	A	A	A	A	B	C
210	A	B	B	B	C	C

In the image forming apparatus K2, tests were conducted in which occurrence of positional deviation of a transferred image of the transfer paper sheet S from an image of an original document is observed by changing the angle  $\alpha$  of the top portion 22 of the suction deck 20 and kinds of the transfer paper sheet S. Table 1 above shows results of the tests. In Table 1, character A represents high image quality having no positional deviation of the transferred image of the transfer paper sheet S from the image of the original document and character B represents intermediate image quality having slight positional deviation of the transferred image of the transfer paper sheet S from the image of the original document, which is usable for character images but is not usable for graphic images. Meanwhile, character C represents poor image quality having large positional deviation of the transferred image of the transfer paper sheet S from the image of the original document, which

is usable for neither character images nor graphic images at all.

In the case where the transfer paper sheet S is thin so as to have small basis weight, Table 1 reveals that positional deviation of the transferred image of the transfer paper sheet S from the image of the original document is increased and is reduced as the angle  $\alpha$  becomes larger and smaller, respectively. Reasons for these phenomena are as follows. Namely, the thin transfer paper sheet S has low rigidity and adhesion of the transfer paper sheet S relative to the photosensitive member 1 at the transfer section X is small. Therefore if the angle  $\alpha$  is large, a sufficiently large slack is not formed on the transfer paper sheet S. As a result, an impact force at the time of travel of the transfer paper sheet S into the fixing section Y is directly transmitted to a portion of the transfer paper sheet S, which is disposed at the transfer section X, so that the portion of the transfer paper sheet S readily deviates in position, thereby resulting in positional deviation of the transferred image of the transfer paper sheet S from the image of the original document. However, if the angle  $\alpha$  is reduced, a sufficiently large slack is formed on the transfer paper sheet S. Hence, an impact force produced at the time of travel of the transfer paper sheet S into the fixing section Y is absorbed by the slack and thus, is not transmitted to a portion of the transfer paper sheet S, which is disposed at the transfer section X, thereby resulting in elimination of positional deviation of the transferred image of the transfer paper sheet S from the image of the original document.

On the other hand, in the case where the transfer paper sheet S is thick so as to have large basis weight, Table 1 reveals that positional deviation of the transferred image of the transfer paper sheet S from the image of the original document is increased and reduced as the angle  $\alpha$  becomes smaller and larger, respectively. Reasons for these phenomena are as follows. Namely, since the thick transfer paper sheet S has high rigidity, an impact force produced at the time of collision of the transfer paper sheet S with one of the upper and lower fixing rollers 51 and 52 is readily transmitted to the trailing edge of the transfer paper sheet S but adhesion of the transfer paper sheet S relative to the transfer section X is large. Hence, if the angle  $\alpha$  is large, the transfer paper sheet S proceeds into the fixing section Y substantially straight, so that the impact force applied to the transfer paper sheet S is small. Therefore, even if the impact force is transmitted to a portion of the transfer paper sheet, which is disposed at the transfer section X, the transfer paper sheet S is immovably held at the transfer section X by the above described adhesion. On the contrary, if the angle  $\alpha$  is small, the transfer paper sheet S having passed through the rollers 28 of the suction deck 20 collides with a side portion of the upper fixing roller 51 without being held in close contact with the transport belts 33 running on the inclined face 24. An impact force applied to the transfer paper sheet S at this time is large. Therefore, the portion of the transfer paper sheet S, which is disposed at the transfer section X, is not held at the transfer section X even by the above described adhesion, thereby resulting in production of positional deviation of the transferred image of the transfer paper sheet S from the image of the original document.

Since transfer paper sheets for use in image forming apparatuses usually have basis weight of 64 to 91.4 g/m<sup>2</sup>, it is preferable from the foregoing that the angle

$\alpha$  ranges from 160 to 165° in ordinary copying apparatuses, printers, etc.

As will be seen from the foregoing description, in the image forming apparatus according to the second embodiment of the present invention, since the rollers are rotatably provided at the top portion of the chevron-shaped suction deck, frictional force between the transport belts passing over the rollers and the suction deck is reduced, so that load applied to the drive system of the transport belts is decreased and thus, it becomes possible to secure stable drive of the transport belts.

Although the present invention has been fully described by way of example with reference to the accompanying drawings, it is to be noted here that various changes and modifications will be apparent to those skilled in the art. Therefore, unless otherwise such changes and modifications depart from the scope of the present invention, they should be construed as being included therein.

What is claimed is:

1. An image forming apparatus comprising:  
an image forming means for forming a toner image on a photosensitive member;  
a transfer means for transferring the toner image on said photosensitive member to a recording paper sheet;  
a fixing means for fixing the toner image on the recording paper sheet, onto the recording paper sheet, which is so provided as to be spaced a predetermined distance from said transfer means;  
a guide member which has a first inclined face for obliquely upwardly guiding the recording paper sheet having the toner image transferred thereto by said transfer means and a second inclined face for obliquely downwardly guiding to said fixing means, the recording paper sheet guided above the first inclined face;  
the first inclined face being formed with a first suction opening, while the second inclined face is formed with a second suction opening;  
a transport belt means for transporting the recording paper sheet to said fixing means along the first and second inclined faces, which is wound along the first and second inclined faces and is formed with a plurality of holes; and  
a suction means which sucks air above the first inclined face through the holes of said transport belt means and the first suction opening and sucks air above the second inclined face through the holes of said transport belt means and the second suction opening so as to bring the recording paper sheet into close contact with said belt above said first and second inclined faces, respectively.
2. An image forming apparatus as claimed in claim 1, wherein said fixing means includes a pair of rollers so as to fix the toner image onto the recording paper sheet by passing the recording paper sheet between said rollers.
3. An image forming apparatus as claimed in claim 1, wherein a vertex of a chevron-shaped guide member connecting the first and second inclined faces deviates towards said fixing means from a center of said guide member.
4. An image forming apparatus as claimed in claim 1, wherein a suction force of said suction means from the first suction opening is larger than that from the second suction opening.

5. An image forming apparatus as claimed in claim 1, wherein an angle formed by the first and second inclined faces ranges from 160 to 165°.

6. An image forming apparatus comprising:  
an image forming means for forming a toner image on a photosensitive member;  
a transfer means for transferring the toner image on said photosensitive member to a recording paper sheet;  
a fixing means for fixing the toner image on the recording paper sheet, onto the recording paper sheet, which is so provided as to be spaced a predetermined distance from said transfer means;  
a guide member which has a first inclined face for obliquely upwardly guiding the recording paper sheet having the toner image transferred thereto by said transfer means and a second inclined face for obliquely downwardly guiding to said fixing means, the recording paper sheet guided therefore "above said" first inclined face;  
the first inclined face being formed with a first suction opening, while the second inclined face is formed with a second suction opening;  
a first roller means which is provided at a vertex of said guide member connecting the first and second inclined faces;  
a second roller means which is so provided as to confront one end portion of the first inclined face adjacent to said transfer means;  
a third roller means which is so provided as to confront one end portion of the second inclined face adjacent to said fixing means;  
a transport belt means for transporting the recording paper sheet to said fixing means along the first and second inclined faces, which is wound around said first, second and third roller means along the first and second inclined faces and is formed with a plurality of holes; and  
a suction means which sucks air above the first inclined face through the holes of said transport belt means and the first suction opening and sucks air above the second inclined face through the holes of said transport belt means and the second suction opening so as to bring the recording paper sheet into close contact with the first and second inclined faces, respectively.
7. An image forming apparatus as claimed in claim 6, wherein said fixing means includes a pair of rollers so as to fix the toner image onto the recording paper sheet by passing the recording paper sheet between said rollers.
8. An image forming apparatus as claimed in claim 6, wherein a vertex of said chevron-shaped guide member connecting the first and second inclined faces deviates towards said fixing means from a center of said guide member.
9. An image forming apparatus as claimed in claim 6, wherein a suction force of said suction means from the first suction opening is larger than that from the second suction opening.
10. An image forming apparatus as claimed in claim 6, wherein an angle formed by the first and second inclined faces ranges 160 to 165°.
11. An image forming apparatus in which a transfer paper sheet having a toner image transferred thereto at a transfer section is transported to a fixing section where the toner image on the transfer paper sheet is fixed onto the transfer paper sheet, said image forming apparatus including a transport device for transporting

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the transfer paper sheet from said transfer section to said fixing section, said transport device comprising:

a chevron-shaped suction deck which is formed with a suction opening;

a transport belt which travels along an upper face of said suction deck; and

a suction means for sucking the transfer paper sheet towards said transport belt through the suction opening of said suction deck,

12. An image forming apparatus in which a transfer paper sheet having a toner image transferred thereto at a transfer section is transported to a fixing section where the toner image on the transfer paper sheet is fixed onto the transfer paper sheet, said image forming apparatus including a transport device for transporting the

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transfer paper sheet from said transfer section to said fixing section, said transport device comprising:

a suction deck which extends in a chevron-shaped configuration from the transfer section to the fixing section so as to have an upward inclined face and a downward inclined face;

the upward and downward inclined faces being, respectively, formed with first and second suction openings;

a roller which is rotatably provided in the vicinity of a top portion of said suction deck;

a transport belt which travels, in contact with an upper face of said roller, along an upper face of said suction deck from the transfer section to the fixing section; and

a suction device for sucking air above said suction deck through the first and second suction openings.

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